

Amendments to the Claims:

Claim 1. (Currently Amended): An X-ray generating apparatus comprising:

an X-ray tube for generating, within a housing sealed into vacuum, an X-ray by focusing an electron emitted from a cathode into an anode target by way of a first grid electrode, a second grid electrode, and a focusing electrode;

grid voltage control means for controlling a grid voltage applied to said first grid electrode; and

pulse generating means for generating a pulse which changes from an OFF state to an ON state and maintains said ON state for a predetermined period of time;

wherein said first grid electrode is disposed on the focusing electrode side of said cathode, whereas said second grid electrode is disposed on the focusing electrode side of said first grid electrode; and

wherein said grid voltage control means has cathode current detecting means for detecting a cathode current and, in response to said pulse generated by said pulse generating means, applies a cutoff voltage to said first grid electrode when said pulse is in said OFF state so as to prevent said electron emitted from said cathode from reaching said anode target, and applies to said first grid electrode, in response to said pulse generated by said pulse generating means, a grid operating voltage adjusted such that said cathode current detected by said cathode current detecting means attains a predetermined value when said pulse is in said ON state[.];

wherein said cathode current detecting means has a cathode current detecting resistor, connected to said cathode, for detecting said cathode current; and

wherein said grid voltage control means has:

an operational amplifier having one input terminal for inputting a voltage generated by said cathode current detecting resistor and the other input terminal for inputting a predetermined negative voltage or a reference voltage positive voltage; and
a grid voltage control circuit for controlling, in response to an output from said operational amplifier, said grid voltage applied to said first grid electrode.

Claims 2-3. (Canceled)

Claim 4. (Currently Amended): An X-ray imaging apparatus comprising imaging means for capturing an X-ray transmission image formed upon irradiating an object to be inspected with an X-ray generated by an X-ray generating apparatus;

wherein said X-ray generating apparatus comprises:

an X-ray tube for generating, within a housing sealed into vacuum, an X-ray by focusing an electron emitted from a cathode into an anode target by way of a first grid electrode, a second grid electrode, and a focusing electrode;

grid voltage control means for controlling a grid voltage applied to said first grid electrode; and

pulse generating means for generating a pulse which changes from an OFF state to an ON state and maintains said ON state for a predetermined period of time;

wherein said grid voltage control means has cathode current detecting means for detecting a cathode current and, in response to said pulse generated by said pulse generating means, applies a cutoff voltage to said first grid electrode when said pulse is in said OFF state so as to prevent said electron emitted from said cathode from reaching said anode target, and

applies to said first grid electrode, in response to said pulse generated by said pulse generating means, a grid operating voltage adjusted such that said cathode current detected by said cathode current detecting means attains a predetermined value when said pulse is in said ON state; and

wherein said cathode current detecting means has a cathode current detecting resistor, connected to said cathode, for detecting said cathode current;

wherein said grid voltage control means has:

an operational amplifier having one input terminal for inputting a voltage generated by said cathode current detecting resistor and the other input terminal for inputting a predetermined negative voltage or a reference positive voltage; and

a grid voltage control circuit for controlling, in response to an output from said operational amplifier, said grid voltage applied to said first grid electrode; and

wherein said imaging means receives said pulse generated by said pulse generating means and captures said X-ray transmission image when said pulse is in said ON state.

Claim 5. (Currently Amended) An X-ray inspection system comprising an X-ray generating apparatus, an X-ray imaging apparatus having imaging means for capturing an X-ray transmission image formed upon irradiating an object to be inspected with an X-ray generated by said X-ray generating apparatus; and object detecting means for detecting arrival of said object in an imaging area in said X-ray imaging apparatus;

wherein said X-ray generating apparatus comprises:

an X-ray tube for generating, within a housing sealed into vacuum, an X-ray by focusing an electron emitted from a cathode into an anode target by way of a first grid electrode, a second grid electrode, and a focusing electrode;

grid voltage control means for controlling a grid voltage applied to said first grid electrode; and

pulse generating means for generating a pulse which changes from an OFF state to an ON state and maintains said ON state for a predetermined period of time;

wherein said grid voltage control means has cathode current detecting means for detecting a cathode current and, in response to said pulse generated by said pulse generating means, applies a cutoff voltage to said first grid electrode when said pulse is in said OFF state so as to prevent said electron emitted from said cathode from reaching said anode target, and applies to said first grid electrode, in response to said pulse generated by said pulse generating means, a grid operating voltage adjusted such that said cathode current detected by said cathode current detecting means attains a predetermined value when said pulse is in said ON state;

wherein said cathode current detecting means has a cathode current detecting resistor, connected to said cathode, for detecting said cathode current;

wherein said grid voltage control means has:

an operational amplifier having one input terminal for inputting a voltage generated by said cathode current detecting resistor and the other input terminal for inputting a predetermined negative voltage or a reference positive voltage; and

a grid voltage control circuit for controlling, in response to an output from said operational amplifier, said grid voltage applied to said first grid electrode;

wherein said pulse generating means has trigger signal outputting means for outputting a trigger signal according to said detection of said object by said object detecting means and outputs said pulse when said trigger signal is outputted from said trigger signal outputting means; and

wherein said imaging means receives said pulse outputted from the pulse generating means and captures said X-ray transmission image when said pulse is in said ON state.

Claim 6. (Canceled)

Claim 7. (New): The X-ray generating apparatus according to claim 1,

wherein said predetermined negative voltage is fed to the other input terminal of said operational amplifier and said operational amplifier outputs a signal such that said voltage generated by said cathode current detecting resistor is at the same potential as said predetermined negative voltage when said pulse outputted from said pulse generating means is in the OFF state, whereas said reference positive voltage is fed to the other input terminal of said operational amplifier and said operational amplifier outputs a signal such that said voltage generated by said cathode current detecting resistor attains the same potential as said reference positive voltage when said pulse outputted from said pulse generating mean is in the ON state.

Claim 8. (New): The X-ray generating apparatus according to claim 1,

wherein said grid voltage control means has further:

a negative voltage generating section for generating said predetermined negative voltage;

a pulse inverter for inputting said pulse generated by said pulse generating means and generating an inverted pulse in which said ON and OFF states of said inputted pulse are inverted;

a first switch for inputting said pulse generated by said pulse inverter and outputting, when said inverted pulse is in said ON state, said predetermined negative voltage generated by said negative voltage generating section;

a reference voltage generating section for generating said reference positive voltage; and

a second switch for inputting said pulse generated by said pulse generating means and outputting, when said pulse is in said ON state, said reference positive voltage generated by said reference voltage generating section;

wherein said predetermined negative voltage outputted from said first switch or said reference positive voltage outputted from said second switch is fed to the other input terminal of said operational amplifier.